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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/779,319

02/13/2004

Michael E. Dresser

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EXAMINER

CHAWAN, SHEELA C

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/779,319	Applicant(s) DRESSER ET AL.	
	Examiner Sheela C. Chawan	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f):
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>2/9/04, 2/25/04, 9/10/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on 2/9/04, 2/25/04 and 9/10/04, the information disclosure statement is being considered by the examiner.

Drawings

2. The Examiner has approved drawings filed on 2/13/04.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-9, 11, 14-20, 21-22 and 24, are rejected under 35 U.S.C. 102(b) as being anticipated by Carrington et al., (US. 5,737,456).

As to claim 1, Carrington discloses an imaging method (fig 1, column 4, lines 37-46) comprising:

displacing (fig 1, element 18, displaying corresponds to video monitor) an imaging device in one dimension while acquiring an image of an (column 4, lines 37- 62) object, thereby blurring the image (column 8, lines 28- 65); and deconvolving the blurred image to generate a multidimensional (column 2, lines 34- 41) representation of the object (column 6, lines 35- 63).

As to claim 2, Carrington discloses an imaging method comprising:

varying the focus of an imaging device (column 3, lines 10-16) while acquiring an image of an object (column 4, lines 37- 62), thereby blurring the image (column 8, lines 28- 65); and
deconvolving the blurred image to generate a representation of the object (column 6, lines 35-63).

As to claims 3 and 21, Carrington discloses the method of claim 2, the representation comprising a two dimensional projection image of three dimensions of the object (column 1, lines 28- 41).

As to claims 4, 11 and 22, Carrington discloses the method of claim 2, the imaging device comprising a fluorescence-imaging device (column 2, lines 34- 41, 48- 50, column 3, lines 20-23, column 5, lines 1-2).

As to claims 5, 14 and 15, Carrington discloses the method of claim 2, varying the focus occurring while a shutter of the imaging device is open (column 8, lines 45- 49).

As to claims 6 and 16, Carrington discloses the method of claim 2, varying the focus comprising varying an input voltage to a piezoelectric focusing mechanism of the imaging device (column 5, lines 3-11).

As to claims 7 and 17, Carrington discloses the method of claim 2, varying the focus comprising applying signals to a piezoelectric focusing mechanism of the imaging device to generate oscillatory movement of the focusing mechanism (column 3, lines 10-16, column 4, lines 37-62, column 5, lines 3-11).

As to claims 8 and 18, Carrington discloses the method of claim 2, varying the

focus comprising launching a velocity-controlled focus change using the stand-based focusing mechanism (column 3, lines 10-16, column 4, lines 37-62, column 5, lines 3-11).

As to claims 9 and 19, Carrington discloses the method of claim 2, acquiring the image being accomplished in two or more stages (fig 1, column 9, lines 32- 65).

As to claim 20, see the rejection of claim 1 above.

As to claim 24, see the rejection of claim 1 above.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 10, 12-13, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carrington et al., (US. 5,737,456), as applied to claims 1-9, 11,14-20, 21- 22 and 24 above and further in view of Subbarao (US.5,193,124).

Regarding claim 10, Carrington discloses an imaging method comprising:

(a) collecting an acquired image of an object using an imaging device (column 3, lines 10-16, column 4, lines 37- 62);

(b) varying the focus of the imaging device while collecting the acquired image, thereby blurring the acquired image (column 3, lines 10-16, column 4, lines 37- 62, column 8, lines 28- 65);

(c) determining a point spread function (PSF) associated with the imaging device (abstract, column 30, lines 53-68);

Carrington is silent about (d) determining an optical transfer function (OTF) using the PSF;

(e) determining an object estimate;

(f) convolving the object estimate with the PSF, using the OTF, to generate an estimated image;

(g) comparing the estimated image with the acquired image to obtain a ratio;

(h) convolving the ratio with a mirror image of the PSF, using a complex conjugate of the OTF, to form a convolved ratio;

(i) multiplying the object estimate with the convolved ratio to form an updated object estimate; and

(j) repeating steps (0 through (i) one or more times to generate a two

dimensional projection image of three dimensions of the object from the updated object estimate.

Subbarao discloses Computational methods and electronic camera apparatus for determining distance of objects, rapid autofocusing, and obtaining improved focus images. The system comprises of:

(d) determining an optical transfer function (OTF) using the PSF (column 7, lines 7- 22);

(e) determining an object estimate (column 9, lines 17- 48);

(f) convolving (column 22, lines 15-60) the object estimate with the PSF, using the OTF, to generate an estimated image (column 26, lines 51-61, column 27, lines 6-38, column 34, and lines 31-44);

(g) comparing the estimated image with the acquired image to obtain a ratio (column 35, lines 45- 50);

(h) convolving the ratio with a mirror image of the PSF, using a complex conjugate of the OTF, to form a convolved ratio (column 20, lines 33- 65);

(i) multiplying the object estimate with the convolved ratio to form an updated object estimate (column 27, lines 6-38, column 41, and lines 13- 54);

(j) repeating steps (0 through (i) one or more times to generate a two dimensional projection image of three dimensions of the object from the updated object estimate (column 27, lines 6-68, column 28, lines 1-8).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Carrington to include an optical transfer function (OTF)

using the PSF. It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Carrington by the teaching of Subbarao in a single constraint as opposed to two or more required in the prior, thus reducing the computational cost of solving the constraint. This constraint is expressed directly in terms of the observed images and the camera parameters. No intermediate parameters (e.g., the standard deviation of the PSF distribution), as suggested by Subbarao at column 13, lines 13- 20).

As to claim 23, see the rejection of claim 10 above.

As to claim 12, Subbarao discloses the method of claim 10, the imaging device comprising a photosensitive camera chip (column 16, lines 54- 59).

As to claim 13, Subbarao discloses the method of claim 10, collecting the acquired image comprising stopping a continual clearing of the imaging device (fig 2).

Other prior art cited

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Price et al., (US. 5,790,692) discloses method and means of least squares designed filters for image segmentation in scanning cytometry.

Dowski, Jr et al., (US 6525302 B2) discloses Wavefront coding phase contrast imaging systems.

Brandt et al., (US 5778038 A) discloses Computerized tomography scanner and method of performing computerized tomography.

Ortyn et al., (US. 6671044 B2) discloses Imaging and analyzing parameters of small moving objects such as cells in broad flat flow .

Ortyn et al., (US.6608682 B2) discloses Imaging and analyzing parameters of small moving objects such as cells.

Contact Information

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sheela C Chawan whose telephone number is. 571-272-7446. The examiner can normally be reached on Monday - Thursday 7.30 - 6.00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eileen Lillis can be reached on 571-272-6928. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sheela Chawan
Patent Examiner
Group Art Unit 2624
April 21, 2007

Sheela Chawan
SHEELA CHAWAN
PRIMARY EXAMINER